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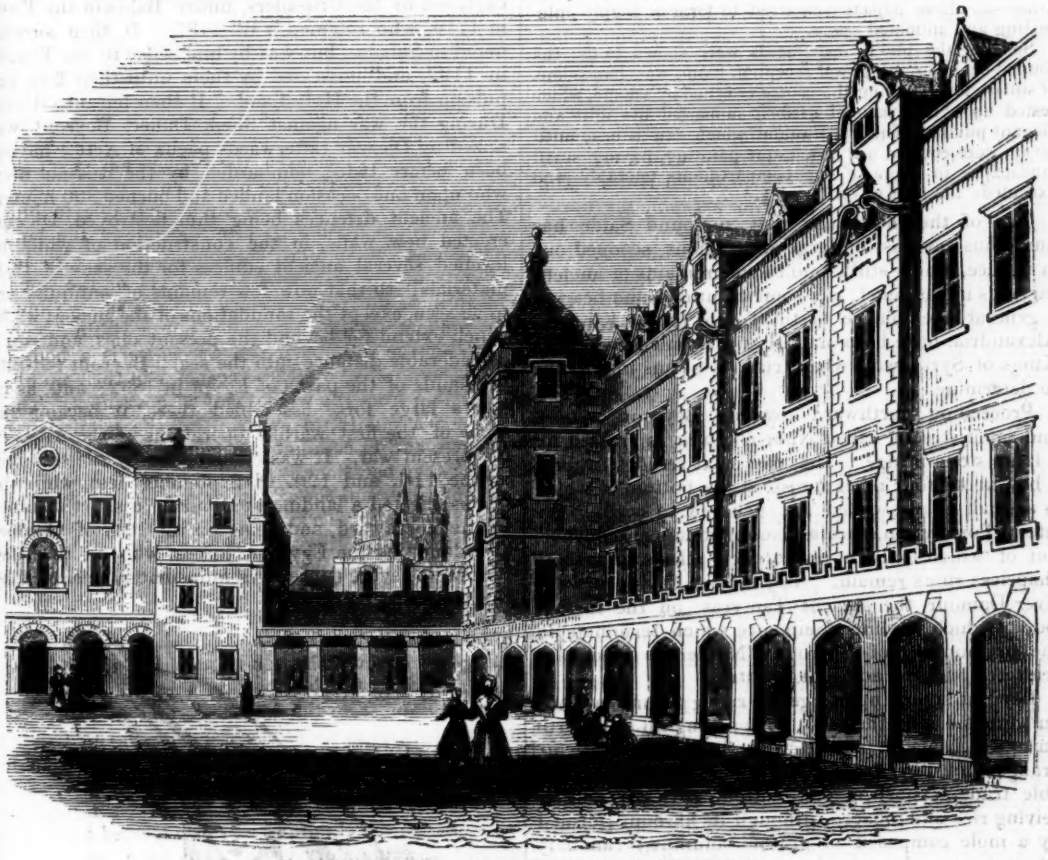
HISTORICAL AND DESCRIPTIVE NOTICE OF CHRIST'S HOSPITAL. III.



THE GRAMMAR AND MATHEMATICAL SCHOOLS.

ALTHOUGH Christ's Hospital may be deemed in some respects a representative of the old Gray Friars' convent, yet the successive rebuildings and alterations have removed the hospital somewhat away from the precise spot where the convent stood. This spot is now occupied by houses, the rental of which forms part of the income of the establishment, while the hospital itself occupies a plot of ground held by a lease from the corporation for several centuries, at a merely nominal rent: this favourable lease appears to have been granted about two centuries ago, on condition of certain property being made over by the hospital to the corporation.

Formerly all ingress to the hospital was by exceedingly obscure and mean passages; but the principal entrance is now through handsome iron gates from Little Britain, at the north-east corner of the building. On entering at this gateway, we see the main area or quadrangle of the building, called the *Ditch*, from an old ditch, which is now twelve feet below the surface. At the left of the entrance stands the house of the treasurer, an old building, which has been gradually enlarged and improved; and near it are the houses of the head-master and the matron. The counting-house, nearly adjoining the treasurer's house, is a commodious building, containing clerks' offices; a court-room, where the general business of the committee of management is conducted, and other buildings. The court-room is adorned with portraits of the principal benefactors to the hospital; including one of Edward the Sixth, by Holbein, and one of Charles the Second, by Sir Peter Lely.

The *cloisters* form the most ancient part of the building, and, being consecrated, are used as a burial-place for officers of the establishment: they open by Gothic arches into a paved quadrangle, called the garden. The western side of these cloisters was formerly surrounded by the old hall; but they were removed on the erection of the new hall, and wards for the boys built on their site. Near this spot is a *shop*, kept by one of the beadles: this may seem curious to the reader; but, as the boys are strictly forbidden to pass the gates, without special permission, the beadles are permitted, under strict regulations, to sell those little matters which school-boys—whether "Blues" or others—are wont to desire for their games and play-ground pleasures: the profits of this shop are divided among the beadles generally.

Westward of the cloisters was formerly a large range of dilapidated buildings appropriated to various

purposes, but since pulled down, in order to make room for the new hall, and for the spacious playground between the hall and Newgate-street. These buildings were the old mathematical and grammar schools, a reading school, the old conventual refectory, a wash-house, a sick ward, an apothecaries' house, and other offices and apartments for domestics. These were one by one pulled down, according as the funds of the institution enabled the governors to rebuild or improve the various apartments; and the new hall was built partly on the site of the old city-wall, and partly on the foundations of the old refectory. This hall, which is by far the most elegant building belonging to the hospital, is a Gothic structure, of which the principal front is of Portland stone, and the back and ends of brick. The fabric is supported by buttresses, has an embattled and pinnacled summit, and an octagonal tower at each extremity, with a range of nine splendid windows in the principal front. The lower story contains the governor's room, the wardrobe, the buttery, and other offices; and the basement is principally occupied by a noble kitchen. The upper story is entirely occupied by the hall, which is one of the noblest rooms in England, being 187 feet long, 51¼ wide, and 46 high. The principal entrance to the hall is by a stone staircase at the east end, and there are three others leading from different offices. The room is lined with oak wainscotting to the height of ten feet, on the north and south sides; and over this wainscotting, on the north side, are carved busts of King Edward, the names and arms of the principal benefactors, &c.; while the panelling on the south side is surmounted by the fine range of windows. A raised platform, together with galleries, is erected at the west end, which contains also an organ, the great picture of Holbein, and two stained glass windows. Tables and benches are ranged along the hall, from end to end, with a pulpit on one side, and the steward's table on the other. A clock is placed behind the steward's chair, and suspended from the ceiling are twelve brass chandeliers. In the centre of the northern side is an enormous picture, painted by Verrio, representing the presentation at court of some of the Christ's Hospital children.

Immediately behind the great hall is the new infirmary, built in 1822, and fitted up with every accommodation for the reception of the boys when sick: a house appropriated to the medical attendant is attached to the northern end of the building. At the eastern end of the hall is a communication to the writing school, an old building of a more substantial character than most other parts of the hospital; and near this are several residences for the inferior officers of the establishment. The grammar and mathematical schools, which, so far as the education of the boys is concerned, are the most important parts of the building, are situated at the northern side of the hospital. They are constructed of a yellowish brick, in the Tudor style of architecture: the grammar schools occupying the western, and the mathematical the eastern division, the entrances to which are from a covered cloister running along the front of the edifice. In a niche at the one end is a statue of Edward the Sixth; and in another, at the opposite end, is a statue of Charles the Second—the respective founders of the two schools. The school-rooms occupy the lower story, and above them are the drawing school, three wards, or dormitories, for the boys, and a room called the boys' library.

A juvenile school is kept up at Hertford, to receive, and partially educate, the youngest boys; and to maintain and educate *all* the girls received into the establishment, since none of the latter are maintained in London. The buildings at Hertford are somewhat similar in object and arrangement to those in Newgate-street, but smaller in size.

It will readily be conceived that an establishment so extensive as that of Christ's Hospital must necessarily require a well-arranged system of internal economy, and a large number of officers and servants. We will therefore briefly detail the principal subdivisions.

The *President* is always an alderman of the city of London, who generally holds the office during life: the office is rather honorary than one to which specific duties are attached; being principally to preside at the Courts of Management. The *Treasurer* is the most important officer. Not only does he manage all the funds of the charity, both in income and expenditure; but he is chairman of all committees, convener of special courts, and has a general supervision over the whole affairs of the charity. He sees that the orders and regulations are obeyed by the officers, who are accountable to him; makes periodical inquiries into the state of the lands and houses belonging to the hospital, and also into the state of the wardrobe and effects of the house. For all these duties he receives no fixed salary; but is accommodated with a handsome house within the precincts of the hospital. The *Committee* is a body of fifty governors, who fill up vacancies in their number by election from the whole body of governors. They sit once a month, to superintend the admission of children, and to conduct the general business of the house: they occasionally visit the hall, the bed-rooms, the infirmary, and the school-rooms.

The *Chief-clerk* is a kind of secretary, whose office is to attend the meetings of the committee, to open all letters addressed to the governors generally, to manage the correspondence of the hospital, to draw up leases and agreements with tenants, and keep a great number of account-books. The *Receiver* is an officer acting in concert with, but subordinate to, the treasurer; through his hands pass the various sums of money to and from the treasurer, and in order that he may be able to make the requisite payments, one thousand pounds are left in his hands, for which he is periodically accountable to the treasurer. The *Wardrobe-keeper* has the charge of the wearing-apparel belonging to the children, and is expected to be prepared for examinatory visits at any time.

The *Steward* has the general custody of the children at all hours when they are not engaged at their studies: he attends them at all their meals: sees that they are punctual in all their allotted duties: receives all the provisions from the tradesmen, and sees that the bills agree with the articles sent in: superintends the division of the provisions among the boys, and sees that each one receives his proper share; and performs other duties connected with the domestic management of the hospital. He is assisted in some of his duties by three of the senior boys, under the name of *Buttery-boys*. There is a singular office filled by one boy, called a *Chaff-boy:* when any little trinket belonging to one of the boys is lost, it is called *chaff*, and is exhibited by the chaff-boy, on the steward's table, at every meal-time, for inspection; and if, after a certain period, the owner does not claim it, it becomes the property of the finder: if money has been in a similar way found, the owner is to share it equally with the finder. In the care of the boys during play-hours, the steward is assisted by *beadles*, each of whom has a certain beat: they act on a sort of preventive police system, by which rude behaviour and accidents are prevented. As it is a fixed rule that no boy shall go beyond the precincts of the hospital, without express leave, a watch is kept at the gates, to

see that this rule is not infringed upon. The *Matron* has an office subsidiary in some respects to that of the steward: she has the nurses under her control, and superintends everything relating to the personal cleanliness and comfort of the boys. She is present in the kitchen at stated times, to see that the food, as well as its mode of preparation, is unexceptionable. She attends in the Hall, at dinner and supper, and, together with the steward, accompanies the boys to Christ-church twice every Sunday. She visits the wards at stated periods, and superintends all the arrangements of beds and bedding. The linen for the establishment is mostly made by the Blue-coat girls at Hertford, and is cut out by, or under the superintendence of, the matron. The *nurses*, who are all freemen's widows, are fourteen in number, and have the personal management of the boys. Each ward, to which one nurse is attached, contains beds and accommodation for about fifty boys.

The Infirmary is under the care of a *Physician*, a *Surgeon*, an *Apothecary*, and a *Nurse*, whose best services are directed to any case of sickness occurring in the school. The apothecary resides within the hospital.

The *Surveyor* (who has a house within the precincts) has the general superintendence of all the lands, houses, and buildings, belonging to the Hospital, whether devoted to the purposes of the establishment, or let to others, and has to draw plans for all the new buildings erected in the hospital, and to superintend the erection. There are also a *Land-surveyor* and a *Solicitor* employed in offices which their titles sufficiently indicate.

Lastly, but not least, we may enumerate the officers employed directly in the instruction of the boys in the various schools,—four classical masters, two mathematical masters, drawing-master, writing-master, two assistant writing-masters, two ushers, and a music-master.

Thus it will be seen that the general superintendence of such a large establishment requires a well-ordered system to be observed in everything, there being no fewer than fifty persons engaged in a daily routine of business connected with the maintenance and education of the boys. Our concluding article will be devoted to the boys themselves; to a sketch of the system of education pursued in the school, and to various matters illustrative of the life of a "Blue."

APPLICATION OF THE DAGUERREOTYPE TO PORTRAITS.

THERE has seldom been a scientific discovery which attracted such immediate and universal attention, or which so many persons aimed simultaneously at improving, as that of the Daguerreotype, or its twin process, photogenic drawing. It was truly remarked by M. Arago, when he first publicly explained the principle of the Daguerreotype, that the extent to which that method might ultimately be carried, could scarcely even be guessed at, as it opened a new field for the production of those works of art, which the draughtsman has hitherto produced. Were it possible to enumerate all the individuals who are at present engaged in forwarding this discovery in England, France, and other countries, the reader would see a strong warranty for expecting a succession of important results from their united labours. We have, in former papers, described the process employed by Mr. Talbot for photogenic drawing, and by M. Daguerre for the Daguerreotype; and we shall continue to present to our readers, from time to time, such new additions as the labours of scientific men may have produced.

On the present occasion we shall describe a mode of producing portraits of individuals, by means of the Daguerreotype, as developed by Professor Draper of New York. The professor states, that very soon after Daguerre's process was known in America, he made attempts to apply it to the execution of portraits from life; and in the course of the experiments into which he was led, he produced several results which are worthy of note, as differing somewhat from those obtained by Daguerre. We will briefly mention a few of these points of difference.

The reader will remember, from the description given in the *Saturday Magazine*, vol. xvi., p. 79, that the Daguerreotype process consists of five stages; viz., 1st, a thorough cleansing of the silver surface of the copper-plate, by means of pumice-stone, olive-oil, cotton, and dilute nitric acid; 2nd, an exposure of the silver to the vapour of iodine, by which the surface acquires a fine yellow gold colour; 3rd, the adjustment of the plate in a camera obscura, so as to receive light only from the illuminated object which is to be represented; 4th, the exposure of the plate at a certain angle, to the vapour of mercury, by which the photogenic figure on the plate is developed and rendered visible; and 5th, the washing of the plate alternately in a solution of common salt and in distilled water, to remove the sensitive coating which the vapour of iodine has produced, and thereby to fix the drawing.

Now, there is not one of these stages but what has received subsequent improvements from the labours of the many scientific men who have directed attention thereto; but the part which seems at present to resist theory most, is the effect of the mercury. Professor Draper asks, "Why does the vapour of mercury condense in a white form on those portions of the film of iodide which have been exposed to the influence of light?" Without attempting any solution of this question, he considers that the cause, whatever it be, may be similar to that which produces the following phenomenon:—If a piece of very clear and cold glass, or a cold polished metallic reflector, has a small object laid upon it, and the surface be breathed over, and the object then removed, a spectral image of the object will be seen by breathing again on the surface, even for several days after the first trial. And also the following:—If a piece of soapstone be made use of as a pencil to write on glass, though the letters that may have been formed are invisible, and though the surface of the glass may be subsequently well cleaned; yet the letters will come into view as soon as the glass is breathed on. Professor Draper even states,—as a parallel instance to those just given,—that if we take a Daguerreotype drawing, clean off the mercury, polish the plate thoroughly with rotten-stone, wash it with nitric acid, and bring it to a brilliant surface, yet, notwithstanding all these processes, the original picture will reappear on exposure to the vapour of mercury. He also states, that the fancied necessity for an angle of 45° in the position of the plate in the mercury-box, is not well-founded; for "plates mercurialize equally well in a horizontal, as in any other position; perhaps a slight inclination may be of advantage, in allowing the vapour to flow with uniformity over the iodized process; but the chief use of an angle of 45° is to allow the operator to inspect the process through the glass."

The professor recommends, that, in polishing the plate previous to the iodizing, whiting be used in addition to rotten-stone, as tending to produce a

more perfect lustre. He also remarks, that, in exposing the polished plate to the iodine, he finds no necessity for the gauze screen; but holds the plate, by means of a temporary handle, about two inches above the surface of some coarse flakes of iodine, placed in a box two inches deep: the iodizing is thus completed in from one to three minutes. Daguerre had suggested that the iodized plate should be inserted in the camera immediately, as the iodide else loses its photogenic property; but Draper has found, that the plate may not only be kept (in the dark) twenty-four hours before it is placed in the camera, but that its sensitiveness is often increased thereby.

M. Daguerre and Sir John Herschel have expressed opinions that the object-glass of the camera should be perfectly achromatic, *i.e.*, capable of focalizing light without producing coloured fringes, in order to produce the photogenic effect; but the American professor deems this achromaticity unnecessary, because the different colours which compose the spectrum take different spaces of time to produce their effect on the iodide of silver, and the plate may be removed before the slowly-acting rays have time to act upon the drawing. Many of his drawings were produced with a common spectacle-lens, of fourteen inches' focus, arranged at the end of a cigar-box as a camera: with this humble camera, he produced highly-finished plates, measuring four inches by three.

The last improvement suggested by Professor Draper which we shall describe, before entering upon his method of producing portraits, is that in the process of *fixing*, or removing the sensitive coating after the mercurializing. Daguerre used a solution of common salt, and other solutions have been still employed; but the process now recommended is exceedingly elegant:—The plate, after being dipped in cold water, is placed in a solution of common salt, of moderate strength; and while in this situation, it is touched on one corner with a piece of bright and clean zinc. The effect produced is remarkable; for the yellow coat of iodide disappears almost immediately; the zinc, the salt-water, and the silver, form a galvanic circuit, by which the zinc is oxidized, and the silver begins to evolve hydrogen gas; whilst this is in a nascent state, it decomposes the film of iodide of silver, giving rise to the production of hydriodic acid, which is very soluble in water, and hence easily removed.

In taking portraits with the Daguerreotype, the chief difficulty has been, to illuminate the face of the person sufficiently for the conducting of the process, without exposing him to a light which the eyes cannot conveniently bear; for if the latter be the case, the eyes are nearly closed, and the eyebrows drawn over them, so as almost to exclude the eyes from the drawing produced. When the sitter is able to bear the light of the sun for a short time, a portrait may be produced in a time varying from twenty to ninety seconds; by placing the sitter before the sun, in the same vertical plane as the sun in the camera, and using a double-convex non-achromatic lens of four inches' diameter, and fourteen inches' focus. If the sun be at a considerable elevation, the shadow of the eyebrows will descend over the eyes, and be thrown into too great an obscurity. To avoid this the following plan is recommended: arrange the camera and the sitter so that the line joining the former and the head of the latter may make an angle of about ten degrees with the incident ray, as falling on the sitter; and this may be effected by the use of one or two reflecting mirrors, so arranged as to deflect the sun's rays into a direction nearly horizontal.

But the more horizontal the solar rays reach the eye, the more painful are they, from the impossibility of shielding the eye by the brow. It is therefore necessary to diminish the intensity of the light by interposing some semi-opaque substance between the sun and the eye. Draper has used for this purpose blue glass, and also ammoniaco-sulphate of copper, contained in a large trough of plate-glass, the trough, and consequently the contained solution, being about an inch thick, and the fluid being diluted to such a degree that the solar light, as transmitted through it, could just be borne by the eye. When a blue or green medium is employed in this manner, the plate requires to be retained in the camera a longer time than under ordinary circumstances.

It may naturally be asked, how far this "portrait-painting" can be carried on under the more agreeable light which we denominate "daylight." On this point Mr. Draper informs us, that on a clear day, and with a very sensitive plate, a portrait can be obtained in the course of five or seven minutes in diffused daylight; but that the advantage which might be supposed to accrue from the features being more composed, and of a more natural aspect, are more than counterbalanced by the difficulty of retaining them so long in one constant mode of expression. An artist in the common course of his operations can delineate the features of a sitter, although those features may undergo occasional changes of expression: but Nature, by means of Daguerreotype, is such a rapid portrait-painter, that every shade of expression is depicted on the plate, almost in the same instant that the features assume that expression: if the expression varies, therefore, the photographic picture would present a confused mingling of features. Mr. Draper recommends, therefore, that the sitter be placed in the same vertical plane as the camera and the sun, with his face towards the sun; that the solar rays be brought into a direction nearly horizontal, by the aid of one or two reflecting mirrors; that a blue-coloured medium be interposed between the sun and the eye of the sitter, in order to prevent the eye from being distressed by the light; that the back-ground should be at some distance behind the sitter, to prevent his shadow from being copied as part of his body; and that the aperture of the camera should be about three and a half or four inches.

In order to keep the head of the sitter in one uniform position, the chair on which he is seated is provided with a staff at the back, terminating upwards in an iron ring, which serves to support the head: the back or side of the head (according as a front view or a profile is to be taken) is rested simply against or partially within the ring, by which it is easily kept steady. This chair should be placed four or five feet from the wall, in order to prevent the shadow of the body from interfering with the picture. To show the remarkable delicacy and minuteness of photographic workmanship, it is stated that if the hands are allowed to rest upon the chest, the slight motion which respiration gives them will produce thick and clumsy hands in the picture; whereas if the hands be held steady, the very veins are depicted with minute accuracy.

With regard to dress, it is found necessary to avoid all strong contrasts in colours, since the brighter tints act more speedily on the plate than the more sombre. If the sitter had a black coat and waistcoat, with the shirt showing within the waistcoat,— a common attire in the present day,—the white shirt would be represented in a shorter time than the coloured portions of the object, and would acquire a blue or even a black tint before the other parts of the picture are finished: the white would, in fact, be "over-done"

by the time the coloured portions were depicted. It is therefore advised, that the dress of the sitter, as well as the back-ground behind him, should be as free as possible from strong contrasts in colour.

The camera, as employed for the production of these portraits, necessarily gives reversed pictures, the right and left sides changing places. To obviate this defect, an American mechanician devised the employment of an elliptical concave mirror, instead of a convex lens: this has the effect of presenting the object in the picture in the same position as in nature: but it has the unavoidable defect of producing only very small pictures, confused, too, at their edges.

In conclusion, we will give Professor Draper's remarks on the degree of success which has generally attended these very curious experiments:—

Miniatures, procured in the manner here laid down, are in most cases striking likenesses, though not in all. They give, of course, all the individual peculiarities, a mole, a freckle, a wart. Owing to the circumstance that yellow and yellowish browns are long before they impress the substance of the Daguerreotype, persons whose faces are freckled all over give rise to the most ludicrous result, a white mottled with just as many black dots as the sitter had yellow ones. The eye appears beautifully, the iris with sharpness, and the white dot of light upon it with such strength and so much of reality and life, as to surprise those who have never before seen it. Many are persuaded that the pencil of the painter has been secretly employed to give the finishing touch.

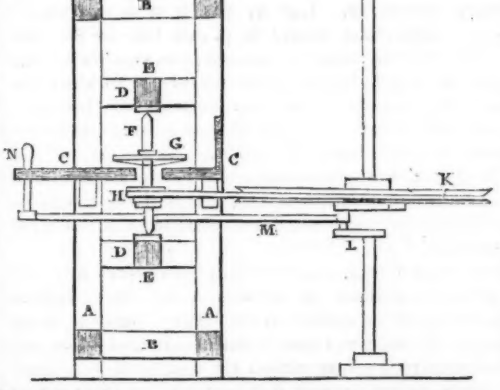
ON GEMS AND PRECIOUS STONES.

VI.

In our former articles we have noticed the more important varieties of gems and precious stones, without any very distinct reference to the curious and difficult art of the lapidary, whereby the beauties and apparent value of gems in general, are brought out in all their gorgeous lustre. We propose, therefore, to detail a few of the processes connected with the cutting and polishing of gems. The operations of splitting or cleaving, and of sawing diamonds, have been already described in *Saturday Magazine*, vol. vii., p. 21; the processes there described pertain, with a few variations, to gems in general; so that we have in this place only to describe the operation of cutting or grinding, and polishing the facets.

Gems are cut and polished by the lapidary, by means of a mill of a very simple construction. It consists of a very strong frame, having four upright standards at the four corners, two of which are seen at A A. These standards are about seven

Fig. 1.



feet in height, and are firmly bound together at the top and bottom by cross-bars B B. The working-bench, or table, may be seen, supported by the standards at C C, and above and below it are represented two pieces D D, which, with similar ones at the other end of the frame, form the support of two long cross-bars, passing through the whole length of the frame, one above the working-bench, the other below it. These bars are seen cut through transversely at E E: they are called *summers*, and their use is to afford bearings for the tops and bottoms of two or three spindles or arbors, one of which is seen at F. These spindles pass through holes in the working-bench.

The spindle being made to turn as freely as possible in its bearings, has a circular metal plate G, which can be taken off or fitted on at pleasure. This plate is called variously *wheel-plate*, *mill-wheel*, or *mill-plate*, and it is on its upper smooth surface that the artist grinds away the facets of the stone. The hardness of the wheel-plate must be proportional to, but not so great as, that of the stone to be cut. Hence the material of which the wheel is composed, the powder used to give it roughness, and the fluid employed to moisten it, must all vary with the comparative hardness or softness of the gem. The diamond is the only gem hard enough to require a steel wheel. This must be of soft steel, both for grinding and polishing, and the powder employed is diamond-dust, moistened with olive-oil.

Gems of the second degree of hardness, that is, of the sapphire kind, including the oriental ruby, &c., are ground and polished on a copper wheel. The powder for grinding is diamond-dust, moistened with olive-oil; and for polishing, Tripoli powder, moistened with water.

The softer gems, such as hyacinth, emerald, beryl, topaz, and garnet, are cut on a wheel of lead, with emery and water; and polished on a tin or zinc wheel, with Tripoli or putty powder and water.

The still softer stones, viz., all the varieties of quartz, opal, and artificial gems or pastes, are cut and polished on a wheel of hard wood. The powder for cutting being emery and water; and for polishing, Tripoli and water.

Let us now see how a very rapid revolving motion is given to the wheel-plate, to enable it to grind down substances so much harder than itself.

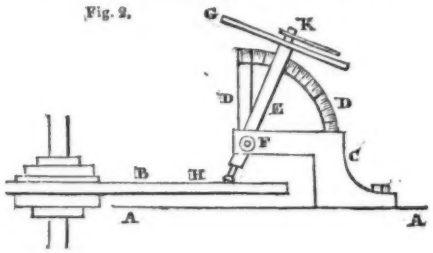
The wheel-plate G is fixed on its spindle immediately above the hole in the working-bench; and just below that hole is fixed on the same spindle a pulley H, or, rather, several pulleys of different sizes, as in a common lathe; so that, by shifting the strap from one to another of them, the speed of the spindle may be increased or diminished at pleasure. The other part of this strap passes round the large horizontal fly-wheel K, which is fixed on a vertical axle, whose lower bearing is in the floor, and its upper bearing in the ceiling of the room. Just below the large wheel, this axle has a crank L, turned by a rod M, whose other end bears an upright handle N, rising through a slit in the working-bench. When the lapidary has fixed the stone in the proper position, he takes hold of this handle, and works it backwards and forwards with his arm, causing the fly-wheel to make one revolution during each stroke of his arm, and thus communicating to the small pulley and to the wheel-plate above, an almost inconceivable degree of rapidity.

The manner in which the lapidary presents the gem to the wheel, so as to grind it accurately, is a most important part of the operations: the gem to be cut or polished must be fixed in so exact a manner that the wheel-plate may act on one facet only at a time.

The utmost nicety is therefore required, and for this purpose the gem is generally fixed to one end of a small rod, called a *cement-rod*, because the stone is attached to it by means of cement.

To receive diamonds, the end of the cement-rod is made like a cup, into which is poured melted solder of tin and lead: the diamond is then plunged up to the girdle into the liquid solder, which, on cooling, retains it firm in its place. When the table-side has been finished, the diamond is taken out by paring away the solder with a knife. The solder is then re-melted, and the cut side of the diamond is plunged in so as to expose the uncut pyramid to be formed into the collet. When this is completed, the cement-rod is fixed to a most ingenious and invaluable instrument, called a *dial*; the most improved construction of which is represented in the following figure.

Fig. 2.



Suppose A A to represent the surface of the working-bench, and B the wheel-plate on its spindle: C is a piece of wood or metal, bearing a fixed brass quadrant D D, which is graduated into ninety degrees; E is a brass tube, fixed on an axis at F, just in the centre of the quadrant, but free to move up and down, so as to point to any required degree. The upper end of this tube bears a flat disk of brass G, which is of a circular shape, (though seen edgewise in the figure,) and has engraved on its upper surface several circles, each divided into a number of equal parts; as many as can possibly be wanted for cutting any circle or tier of facets on a stone. Now the cement-rod H K is passed up the tube E. It has the stone H fixed to its lower end, and to its upper end is affixed a hand K, like that of a watch, by turning which so as to point to any division on the circular plate, the stone is of course turned on its axis. Now suppose the tube E to be vertical, or pointing to ninety degrees, at the top of the quadrant D. Then the stone will be in the proper position for cutting the *table*, or horizontal face of a brilliant. The cement-rod is, of course, pushed down till the lower point of the stone just touches the wheel-plate: sometimes it is kept down by a weight placed on the top of the cement-rod. When this point has been ground down far enough to produce a table of the requisite size, it has to be surrounded by eight more facets, perfectly equi-distant, equal in size, and regular. The artist first ascertains what angle their planes should make with the plane of the former large facet or table. Suppose this to be twenty degrees, he lowers the tube E till it points to the twentieth degree below the top of the quadrant D. It is then fixed in that position by a small screw, and the hand K is made to point to one of the divisions of a circle that contains eight parts. The cement-rod being then slid down till the stone touches the wheel-plate, one of the first tier of facets will be cut with unerring accuracy. When this is done, the hand K is moved on to the next division, and another facet is cut. When the hand has been moved entirely round the circle, the first tier, or circle of eight facets, will have been cut. In order to begin the next tier, the place of the tube E is shifted, and brought lower down on the quadrant, so as to present the stone still more obliquely to the grinding-plate. This tier probably contains sixteen facets, therefore the hand is pointed successively to all the divisions in the circle of sixteen parts; but the tube E is not moved till the tier is finished, and a still lower one about to be begun. This most ingenious contrivance has hitherto been used only by the inventor, a very expert lapidary of Geneva.

When the facets are all cut, they are dull, like ground-glass, and therefore have to be polished: this consists in simply repeating the operation, but with a softer and finer powder, and sometimes a wheel-plate of a different metal, as has been already described.

This notice would be incomplete without some mention of the ancient and curious art of making imitative gems. We say *imitative* to distinguish them from *artificial* gems, or those which exactly resemble the natural ones in their internal properties, composition, &c., as well as in their external appearance. Artificial gems have been very seldom produced; indeed, almost the only one that has been *really formed by art*, is the ruby, and that only in very small crystals.

Imitative gems are composed of various kinds of coloured glass, of superior hardness and refractive power. In this manner the colour and the play of light of real gems can be so nearly imitated, that in former times, such *pastes* (as superior kinds of glass are called) were often sold at immense prices as true stones. Such frauds can scarcely happen now, since there is a simple test, that of *hardness*, by which every person may soon learn to distinguish real gems from the best imitations which can be made in paste.

This art is of very remote antiquity, as is proved by many ancient Egyptian relics. Pliny says that the Greeks and Romans also imitated gems by colouring crystals; a method still partially in use. In the middle ages, this art was kept a profound secret, and in most books false recipes were given, which, if followed implicitly, could never produce the desired effect. This has been remarked even in the works of Neri and Kunkel, which were once thought to be the best guides in making imitative gems.

In later times M. Fontanieu has made some valuable researches and experiments on the subject. He divides the composition into *bases*, or pure white pastes, and *colouring substances* to be added in very small quantity to the bases. When the different ingredients of the composition which forms a *base*, are reduced to powder and well mixed together, they are placed in a Hessian crucible, and melted by the heat of a furnace or forge. The melted substance is called *frit*. It is poured into cold water, and if any lead be separated in metallic globules, it is carefully removed. The substance is re-melted, and the same process repeated three times, each time in a new crucible, and with pure water. Lastly, it is powdered, mixed with colouring matter, and melted into the proper shape.

There is another very superior base, called *Mayence base*, or *strap*, from the name of its inventor; it is thus made:—three parts of carbonate of potash, and one part of silica, prepared from rock-crystal, are mixed and melted together. When cool, this is dissolved in warm water, and nitric acid is added till no more precipitate forms. The precipitate is then well washed and dried; and two parts of it are mixed with three parts of ceruse. This is melted, and poured into cold water. It is again powdered, and mixed with one-twelfth of its weight of borax, and again melted. This having been poured into cold water and powdered, is mixed with one-twelfth of its weight of nitre, and again melted for use.

For imitating the diamond, M. Fontanieu says, that he knows of no better composition than a base of twelve parts silica, twenty litharge, four nitre, four borax, and two white arsenic. Of course no colouring matter is wanted.

For *blue sapphire*, Fontanieu recommends twenty-four ounces of the Mayence base, coloured with forty-six grains of zaffre, or oxide of cobalt.

For the *oriental ruby* forty parts of the Mayence base made with flints, four parts rock-crystal, and one part fusible manganese. The fusible manganese is made by making the common manganese red-hot, and then plunging it in vinegar.

For the ballas ruby, or spinelle, there should be one-fourth less colouring matter.

The proper base for the *hyacinth* is, according to Loysel, one hundred parts silica, two hundred and fifty minium, from fifteen to twenty fused potash, and from twenty-five to thirty borax.

To imitate the *amethyst*, he uses twenty-four ounces of Mayence base, four drachms fusible manganese, four grains precipitate of cassius.

For the imitation of the *garnet*, two ounces Mayence base, one ounce glass of antimony, one grain each of Cassius's precipitate and of oxide of manganese.

M. Fontanieu has published a large work on the subject of making these imitations. We have directed the attention of our readers to a few specimens, and might have added many more, if our limits would have allowed, or the details had been sufficiently interesting to the general reader.

THE SYRIAN COAST. VI.

From Beyrout an old Roman road, constructed by the Emperor Antoninus, runs along the shore towards Djebail. It soon crosses a small stream, (supposed to be the Magoras of Pliny,) which, when swollen by rains, foams so violently in its rocky bed, that it has received the name of Nahr-el-Leban (*Milk River*). About four miles further the road is carried along the face of a lofty cliff, adorned with numerous sculptures and inscriptions, now much defaced, but supposed to be of Phœnician origin; and a short distance beyond occurs a deep ravine, through which the Nahr-el-Kelb (*Dog River*) rushes to the sea with extreme fury. This stream, the Lycus of antiquity, derived both its former and present name from a tradition that an idol in the form of a dog, or wolf, was once worshipped on its banks, and near its mouth is still found a broken pedestal, presumed to have been that of the idol: the figure of a dog also occurs, carved in the rocks, near the bridge, constructed by Fakr-el-Din, by which the stream is crossed. This river is the southern boundary of the exclusively Christian district of Kesrouan, principally inhabited by the Maronites, but also containing some Catholics, Greeks, and Armenians: it extends northward to the Nahr-el-Kebir, (*Great River*,) beyond Tripoli.

Proceeding along a rocky shore towards Djebail, (about twenty miles from Beyrout,) we soon reach the town of Djournie, where occur a lofty square tower and several other Roman remains, it being the site of an ancient city, termed Palæ-Byblos, whose inhabitants founded a second Byblos, higher up the coast. It was at Djournie that the Allied camp was recently established. The bay of Djournie is spacious, its southern promontory running far out to sea, and having at its extremity a small chapel cut in the rock, which bears the name of the tomb of St. George; and the mountain-peaks in the back-ground are crowned by Christian convents. The road next crosses another lofty cliff, (Mount Climax,) where, for more than a mile, the path is less than six feet wide, and overhangs the sea*, beyond which is seen the Nahr-Ibrahim, a stream rushing through its deep rocky channel, and in its general appearance much resembling the Nahr-el-Kelb. The river has its name from the builder of a bridge over it, and is the classic Adonis, which at certain seasons

> Ran purple to the sea, supposed with blood
> Of Tammuz yearly wounded:

a fancy fostered by the priests of the neighbouring city of Byblos, where was a magnificent temple of Adonis, or Tammuz.

Three miles distant, on a hill by the sea, lies Djebail, the representative of the Gebal of Scripture and the Byblos of antiquity, and still a place of some importance. It is surrounded by well-cultivated gardens, exports much of the silk of the Kesrouan, and has a population of about 3000 persons. Its ancient extent is proved by numerous ruins, principally Roman, in its neighbourhood, and it also contains the remains of a Christian church, of Corinthian architecture, supposed to have been erected in the fourth century. Upon the southern side of the town stands a castle, of mixed Roman and Saracenic architecture, whose solid and lofty walls are more than a mile in compass, and are strengthened by numerous towers. This castle was captured by the English and their allies early in the present war.

From the Bible we learn that the people of Gebal were early celebrated for their skill in squaring stone for building, (1 Kings v. 18†,) and they are also mentioned as the caulkers of Tyre, (Ezek. xxvii. 9.) But its chief renown arose from its being the reputed birth-place of Adonis, and the principal seat of his worship; which, however, was practised in other quarters, and at one time prevailed among the Jews under the Syrian name of Tammuz. Among "the great abominations that the house of Israel committed," the prophet Ezekiel in a vision saw the "women weeping for Tammuz." (Ezek. viii. 14.)

The history of Byblos differs too little from that of most of the towns along the coast to need much detail. Its ceremonies in honour of Adonis, in a somewhat modified form, were still practised in the fifth century of the Christian era. The first Crusaders passed it without injury in consequence of an agreement made with the emir of Tripoli, but it was captured by Raymond of Toulouse in 1104, and the wall by which it is now surrounded was built by the Christians, in whose hands the place remained till 1289. Though in the Maronite country it until recently had a Druse garrison, but this before the recent attack had been replaced by a body of Albanians.

Ten miles to the northward of Djebail lies the small town of Batroun, or Patrone, the ancient Botrys. This place is said to have been founded by Ithobal, king of Tyre, (B.C. 920,) and in the time of the Roman empire had a spacious artificial harbour, to which a vast rock, torn from Lebanon by an earthquake, and hurled into the sea, served as a mole. The only harbour now used is a narrow canal, cut between the rocks, in which a few boats find shelter, the principal trade of

* This pass was the scene of a gallant exploit of Baldwin the First of Jerusalem, when on his journey from Antioch to that city, to assume the crown. "Baldwin was informed that the Turkish princes of Damascus and Emesa were lying in wait for him at the pass, upon which a part of his followers quitted him through fear, but he was himself resolved rather to die than to turn back. On coming to the pass he found some of the Turks posted in it, others on the rocks above it, while beneath, on the sea, were ships, from on board of which the Turks discharged their arrows at his troops. To win his way by force he saw was impossible: he therefore had recourse to stratagem. At break of day he commenced a retreat, and led his men back to the plain. The Turks, as he had hoped, pursued; the Christians turned; the Turks were routed and driven over the pass, and Baldwin, collecting his men, urged his way along it with all speed, and safely reached the plain at the other side.—Keightley's *Crusaders*.

† The Hebrew word rendered "stone-squarers," in this passage, *is Giblim*, meaning inhabitants of Gebal or Giblus, whence the transition to the classical appellation of after-days, Byblos, is obvious enough. It is, however, very probable that Palæ-Byblos (Djournie) may be meant.

the place consisting of the export of tobacco. There are the ruins of a Christian church and of a monastery, but no remains of the ancient fortifications. Batroun was captured with little difficulty by the Allies, on the 15th of September last. Hence to Tripoli, a distance of about fifteen miles, the road runs over the foot of the loftiest mountains of Lebanon, on one of which are seen what still remain of the famous Cedars of Lebanon, a group of about fifteen trees, of vast dimensions and patriarchal age, and numerous others of smaller size. They stand high up the mountain, among the snow, and form a grove of about a mile in circumference. The country to seaward is a vast promontory, the western point bearing the name of Cape Madonna, or Ras-el-Shakaa, the Theouprosopon of antiquity, and then a resort of pirates, who were extirpated by Pompey. The pass over the promontory is very steep and narrow, and at its foot towards Tripoli are found the villages of Callemone and Enzy—the first the ancient Calamos, the second probably occupying the site of Trieris, but a huge pile of ruins in its neighbourhood is described by some travellers as the remains of a Christian church, by others of a heathen temple. High up the mountain at the foot of which Callemone is situated, and overlooking the sea, is a large convent belonging to the Catholic Greeks, called Belmont, founded by one of the Latin counts of Tripoli, and during the Crusades more than once employed as a military post, as it completely commands the approach to the plain of Tripoli from the south.

Tripoli, (now called by the inhabitants Tarabolos,) described as one of the best-built and cleanest towns of Syria, stands on a small triangular plain, washed by the sea on the north and south, with a hill, crowned by a Saracenic castle, on the east, and some low sand-hills on the south-west. The town is divided into two portions by the Nahr-Kadesha, which runs by the castle, the part to the north, styled El-Mina, or Marina, being the port. The luxuriant groves of orange, lemon, mulberry, and other fruit-trees, cultivated with the utmost care, which meet the eye in every direction, and the noble poplars and plane-trees, beside various odoriferous shrubs, which abound, give a very pleasing aspect to Tripoli. But it has numerous disadvantages; for its harbour is small and unsafe, and the situation extremely unhealthy, owing in a great measure, it is supposed, to the artificial inundations which are resorted to for the purpose of procuring a second foliage from the mulberry trees, after they have been stripped to feed the silk-worms, silk being one of the principal articles of export. The population of Tripoli is estimated at 15,000, a large proportion of them Catholic Greeks, the port being inhabited almost exclusively by them.

The name of Tripoli, it is said, was bestowed by the Greeks, upon three settlements formed upon this spot, by Sidon, Tyre, and Aradus, which were afterwards united into one, and then served as a kind of federal city to the various Phœnician states. Three ancient sites are still distinguishable on the promontory,—that on the south, however, being nearly obliterated by sand washed upon the beach. Granite and marble columns are found scattered about in every direction, but particularly along the beach, and on the banks of the river; and of a chain of five square towers*, of Saracenic origin, which extends from the castle to the port, the lower part of each is strengthened with broken columns, piled horizontally. One of these towers is styled the Lion's tower, as it bears a sculpture of two lions on a shield, the cognizance of the Latin counts; and indeed in no town in Syria do more vestiges of the dominion of the Crusaders exist than here. The town is supplied with water by an aqueduct, which bears the sign of the cross on many of its arches, and is called the Prince's Bridge*; most of the mosques have evidently been Christian churches, and are handsome edifices; the bazaars and khans, also, are the ancient monasteries and nunneries; and several of the streets have on each side arcades of rude Gothic architecture: the castle, too, has much of the distinctive character of the feudal fortress superadded to its original structure.

Nothing of any particular importance occurs in history regarding Tripoli until the time of the Crusades. Its emir unsuccessfully assailed the first pilgrims while besieging Arca, (A.D. 1099,) but an accommodation was effected, and they passed on to Jerusalem. In 1104 it was besieged by Raymond of Toulouse, who died before its walls, but it was not captured till 1109, when the victors threw down a strong wall by which the city had been defended on the east, sacked the town, and burnt a valuable library which it contained. The city, with the territory between the Nahr-el-Kelb and the Nahr-el-Kebir, was erected into a county, and bestowed on Bertram, the son of Raymond, and the counts of Tripoli played an important part in the history of the Holy Land. They frequently entered into truces with their Mohammedan neighbours, and were often suspected of favouring them more than their Christian brethren. Count Raymond of Tripoli, for instance, is charged by both Christian and Mohammedan writers with betraying the Christian army at the battle of Tiberias (A.D. 1187). As the battle was to be fought in his territory, by an old feudal rule he was entitled to choose the spot, and, after communicating with Saladin, he led them into a valley without water, where they were surrounded on all sides by the enemy, and when the battle commenced, he fled, with his retainers, at the first onset. By this policy they preserved themselves in the possession of at least a part of their territories, in spite of the changes which the rest of the country underwent, till at length the Egyptian Mamelukes expelled them, and desolated their city, in 1289, two years before the fall of Acre.

From this period Tripoli presents little more than a series of attempts on the part of its Mohammedan governors to render themselves independent of the Porte, which were met by granting the territory to some other pacha, who when successful seldom failed to act like his predecessors. In spite of these disadvantages, however, it has remained a place of considerable trade, especially in silk and sponge, the traffic being for a long time almost exclusively in the hands of the French; but one of its rulers, Djezzar, afterwards pacha of Acre, expelled them, and they have not since been able to regain their former footing. Under the rule of Mehemet Ali, Tripoli was usually the station of a regiment of cavalry, and another of infantry, for whose accommodation stone barracks were erected, but upon the appearance of the Allies upon the coast, the garrison, previously reduced in order to reinforce the army in the field, abandoned the town, after a trifling resistance, one of the beforementioned line of towers having been undermined and blown up by the assailants.

* There were formerly six towers, but one has been recently blown up by the Allied force.

* The water is brought from one of the mountains, about eight miles distant. The structure near the town crosses the Nahr-Kadesha, and then serves the purpose of a bridge as well as an aqueduct. It is believed to have been constructed by Baldwin the First of Jerusalem.

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